



⑪ Publication number : **0 477 814 B1**

⑫ **EUROPEAN PATENT SPECIFICATION**

④⑤ Date of publication of patent specification :
13.09.95 Bulletin 95/37

⑤① Int. Cl.⁶ : **H01R 43/04, H01R 43/042**

②① Application number : **91116128.9**

②② Date of filing : **23.09.91**

⑤④ **Dieless compression head and method of crimping.**

③① Priority : **27.09.90 US 589331**

④③ Date of publication of application :
01.04.92 Bulletin 92/14

④⑤ Publication of the grant of the patent :
13.09.95 Bulletin 95/37

⑧④ Designated Contracting States :
ES IT

⑤⑥ References cited :
US-A- 2 898 790
US-A- 3 619 885
US-A- 4 136 549

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Description

The present invention relates to an electrical connector crimping tool and to a method of crimping an electrical connector according to the preambles of the independent claims. Such a tool and such a method are known from US 3 619 885. More particularly, the invention relates to a dieless compression head and a method of crimping electrical connectors onto conductors.

It is well known in the art to terminate electric cables by inserting an end of a cable into a connector which is then compressed or indented so as to form a mechanical and electrical connection between the cable and connector. U.S. Patent 3,644,989 to Morby discloses a compression indenting tool with a piston that carries a punch with the overall form of a four-sided pyramid. U.S. Patent 4,136,549 to Lytle et al. discloses a hydraulic compression tool with a dieless compression head used in crimping or compressing connectors to cables. Although dieless compression heads, also known as universal compression heads, have been known and used in the past to crimp a variety of size connectors and conductors, a problem nonetheless existed in the prior art in that the universal compression heads were unable to crimp all sizes of connectors and conductors with the same degree of quality. In order to properly crimp a relatively large connector with a relatively large conductor, such as a 1000 MCM wire size conductor, the front of the indenter needs to be broad to prevent the indenter from inadvertently piercing through the connector rather than properly compressing the connector. However, in order to properly crimp a connector onto a relatively small conductor, such as a 6 AWG wire size conductor, the front of the indenter should be narrow such that the indenter can indent the connector and not merely flatten the connector which would not produce a good crimp. The prior art universal compression heads have been unable to adequately support both of these divergent requirements and provide the same type of quality connections for a full range of connectors and conductors sizes.

US 3 619 885 discloses a variable diameter crimping tool. It comprises a frame supporting an anvil and a ram movably mounted to the frame. The ram has a front part having angled sides. The anvil and the angled sides of the ram are adapted to matingly contact each other when the ram is advanced into contact with the anvil.

It is the object of the present invention to provide a tool and a method allowing the making of a reliable crimp connection between a connector and a conductor.

This object is solved in accordance with the features of the independent claims. Dependent claims are directed on preferred embodiments of the invention.

In accordance with one embodiment of the invention the indenting extension may have a general pyramide shape. The second portion forms a leading tip of the ram and the first portion is located longitudinally behind the second portion. The anvil is connected to the frame and has two angled sides adapted to be matingly contacted by the ram first portion angled sides when the ram is advanced into contact with the anvil. The means for moving the ram can move the ram relative to the anvil to crimp an electrical connector therebetween.

In accordance with the present invention, a method of crimping an electrical connector to a conductor is provided. The method includes providing a compression tool having a compression head with an anvil surface, a ram with an indenting surface extending from a not completely occupied flat section of a forward portion of the ram and having a general pyramid shape, and means for stopping forward movement of the ram at a predetermined distance of the top of the pyramid shape from the anvil. The means for stopping forward movement comprises the forward portion of the ram, located behind the pyramid shape, being adapted to contact the anvil surface and stop forward movement of the ram. The method further comprises advancing the ram from a first position into contact with an exterior of a connector, the connector being sandwiched between the ram and the anvil; deforming the connector by advancing the ram past its contact position with the connector; and stopping the forward advancement of the ram upon the occurrence of a predetermined force between the ram and anvil. The predetermined force can occur either directly between the ram and anvil at the means for stopping movement when crimping a connector and conductor of a first size or, the predetermined force can occur between the ram and anvil through the connector when crimping a connector and conductor of a second relatively larger size.

The foregoing aspects and features of the invention are explained in the following description, taken in connection with the accompanying drawings, wherein:

Fig. 1 is a plan side view of a hydraulic compression tool incorporating features of the present invention.

Fig. 2 is a partial schematic cross sectional view of the compression head of the tool shown in Fig. 1 with the ram at a first position.

Fig. 3 is a schematic cross sectional view of the compression head as in Fig. 2 with the ram at a second position.

Fig. 4 is a side view of the front of the ram shown in Figs. 1 thru 3.

Fig. 5 is a plan top view of the ram shown in Fig. 4.

Fig. 6 is a partial perspective view of the front of the ram shown in Fig. 5.

Referring to Fig. 1, there is shown a plan side view of a hydraulic compression tool 2 incorporating features of the present invention. The tool 2 generally comprises a first handle 4 having a fluid reservoir therein, a second handle 6, a body 10, and a compression head 12. Although the present invention is being described with reference to a hydraulic compression tool, it should be understood that the invention can be incorporated into any suitable type of compression apparatus or crimping tool. In addition, any suitable size, shape, or type of materials can be used.

The hydraulic compression tool 2 shown in Fig. 1, with the exception of its compression head 12, is essentially identical to the hydraulic compression tool shown and described in U.S. Patent 4,947,672 to Pecora et al. which is hereby incorporated by reference herein in its entirety. The compression head 12 generally comprises a cylinder body or frame 14 having a hydraulic cylinder therein, and an indenter or ram 16 movably mounted to the frame. Connected to the cylinder body or frame 14 is an anvil 18. The anvil 18 is connected to the frame 14 by two pins 19 and 20. In the embodiment shown, the second pin 20 is removable from the anvil 18 such that the anvil can pivot at pin 19 to open an area 22 intended to receive a connector.

The anvil 18 is generally comprised of metal with a center section 24 and two end sections 26 and 27 having slots 28 and 29 for receiving forward legs 30 and 31 of the frame 14 such that the pins 19 and 20 can fixedly mount the anvil 18 to the frame 14. The interior side of the center section 24, adjacent area 22, generally forms the anvil surface 25 of the tool 2 for contacting the exterior of a connector. In the embodiment shown, the anvil surface 25 includes two angled side portions or surfaces 32 and 33 with a center flat portion 34 therebetween at the center of the anvil 18. The two angled side portions 32 and 33 are angled about 75 degrees relative to each other. However, any suitable type of angle or shape of the anvil surface 25 can be provided as further described below.

The ram or indenter 16 is generally comprised of metal with a rear section (not shown) that is capable of being pushed forward by hydraulic fluid to advance the indenter 16 relative to the frame 14 and anvil 18. As described above, the ram 16 is movably mounted to the frame 14 for movement towards and away from the anvil 18. Referring also to Figs. 4-6, the front 36 of the ram 16 is generally comprised of two portions or sections; a pyramid section 38 forming the leading edge to the ram, and an angled side section 40 located longitudinally behind the pyramid section 38. In the embodiment shown, the pyramid section 38 is comprised of a single four sided pyramid 39 with a flat top 42, base 44 and sides 45, 46, 47, 48. In the embodiment shown, the first two opposite sides 45 and 46 are angled relative to each other at an angle of about

109 degrees. However, any suitable angle can be provide as further described below. In the embodiment shown, extending from the base 44 at opposite sides 47 and 48 of the pyramid 39 are two flat sections 50 and 51. Extending from the base 44 from sides 45 and 46 of the pyramid are two angled surfaces 52 and 53 that form the angled side section 40 of the indenter 16. In the embodiment shown, the surfaces 52 and 53 have an angle of about 75 degrees relative to each other. Thus, in the embodiment shown, the angle of the ram angled surfaces 52 and 53 is the same as the angle of the anvil angled contact surfaces 32 and 33.

In the embodiment shown, the indenter 16 has a potential range of motion from a home position as shown in Fig. 2 through to its end of range of motion at a fully extended position as shown in Fig. 3. At the fully extended position the angled surfaces 52 and 53 of the ram side section 40 matingly contacts the angled contact surfaces 32 and 33 of the anvil 18. Thus contacted, the ram 16 is prevented from further advancement. In the embodiment shown, the pyramid section 38 is suitably sized and shaped such that when the indenter 16 is moved to its fully extended position, the pyramid 39 is spaced from the anvil and has a spacing A between the anvil center portion 34 and the pyramid's top 42. In a preferred embodiment of the invention, the spacing A is about 0.26 inch. However, any suitable spacing could be provided.

The novel configuration of the ram front 36 and anvil surface 25 allows the tool 2 the ability to crimp connectors onto conductors for both relatively large connectors and relatively small connectors, without significant crimp quality variation. Generally, when crimping a large connector onto a large conductor the ram 16 is advanced by pumping the handles 4 and 6 until the connector is sandwiched in area 22 between the ram front 36 and anvil surface 25. The handles 4 and 6 are further pumped with the ram 16 advancing and deforming the connector with the conductor. As the ram moves forward, the pyramid 39 presses into the connector without piercing the connector. Once the pyramid 39 is well embedded with the connector, the flat sections 50 and 51 contact the connector to increase the area of the ram front that is in compressing contact with the connector. Eventually, due to the increased area of contact between the ram front 36 and the connector, insufficient hydraulic pressure in the tool 2 prevents the ram from achieving sufficient force, because of the increased area, and being further advanced, thus resulting in a proper crimp without piercing the conductor.

When crimping small diameter connectors, the flat sections 50 and 51 do not substantially come into play. Basically, the connector is merely crimped between the pyramid 39 and anvil 18. The depth of the crimp into the small connector is controlled by the spacing A. As the ram advances the pyramid 39 indents into the connector. The pressure in the hydraul-

ic system of the tool 2 never reaches its blow off pressure to stop crimping until the ram 16 contacts the anvil 18. As shown in Fig. 3, when the ram 16 contacts the anvil 18 the pyramid, due to its relatively modestly sloped sides 45 and 46 and its height, does not contact the anvil 18, thus establishing a predetermined spacing between the pyramid and anvil surface for a predetermined crimp and shape.

It should be noted that the tool 2 blows off on pressure, not travel distance. Thus, the tool 2 is capable of crimping range taking connectors. For range taking connectors, however, since the conductor is a smaller size than the connector, the ram 16 can obviously advance even after the flat area 50 and 51 contact the connector until such time as the connector is suitably crimped onto the conductor with suitable pressure. Although the anvil surface 25 has been described above as a wedge shape with two flat angled surfaces 32 and 33 with a flat section 34 therebetween, it should be understood that any suitably shaped anvil surface could be provided including curved surfaces and stepped surfaces. In addition, the anvil angled surfaces can have any suitable angled so long as the pyramid 39 is suitably sized and shaped to be spaced from the anvil surface 25 at the ram's fully extended position. Although the means for stopping the forward advancement of the ram 16 has been described as the abutment of the ram angled surfaces 52 and 53 meeting the anvil surfaces 32 and 33, it should be understood that any suitable means could be used to stop the advancement of the ram 16 at its fully extended position. In addition, although the pyramid 39 has been described as a four sided pyramid with a flat top, any suitably shaped extension at the leading edge of the ram could be provided and the term pyramid used herein should be interpreted as such. The indenting extension or pyramid 39 could also be provided on the anvil surface 25 or could be provided as multiple pyramids.

Let it be understood that the foregoing description is only illustrative of the invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the scope of the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variances which fall within the scope of the appended claims.

Claims

1. An electrical connector crimping tool comprising: a frame (14); a ram (16) movably mounted to the frame (14) the ram (16) having a front (36) with a first portion (40) having two angled sides (52, 53) enclosing a flat section (50, 51) inbetween them, an anvil (18) connected to the frame (14), the anvil (18) having two angled sides (32, 33) adapted to be matingly contacted by the ram first portion (40) angled sides (52, 53) when the ram (16) is advanced into contact with the anvil (18); and means for moving the ram (16) relative to the anvil (18) to crimp an electrical connector therebetween, characterized in that the front (36) has a second portion (38) having an indenting extension, the second portion (38) forming a leading edge of the ram (16) and the first portion (40) being located longitudinally behind the second portion (38), the indenting extension extending from the flat section (50, 51) of the first portion (40), such that the flat section (50, 51) is not completely occupied by the second portion (38).

2. A tool as in claim 1, characterized in that the ram (16) first (40) and second portions (38) are suitably sized and shaped such that contact of the first portion angled sides (52, 53) with the anvil angled sides (32, 33) stops forward advancement of the ram (16) with the second portion (38) being spaced a predetermined distance from the anvil (18).

3. A tool as in claim 2, characterized in that the predetermined distance is about 6,6 mm (0.26 inch).

4. A tool as in claim 1, characterized in that the indenting extension has a flat top (42).

5. A tool as in claim 1, characterized in that the indenting extension is a general pyramid shape with four sides.

6. A tool as in claim 5, characterized in that the ram front (36) has two flat side sections extending away from a base of the pyramid shape.

7. A tool as in claim 6, characterized in that the two angled sides (52, 53) extend from the base of the pyramid shape.

8. A tool as in claim 1, characterized in that the anvil (18) has a flat top section (34) between the two angled sides (32, 33).

9. A tool as in claim 1,

characterized in that the indenting extension has a pyramid shape located in front of the two angled side portions, the pyramid shape (38) being suitably sized so as not to contact the anvil (18) when said ram side portions (52, 53) contact the anvil contact surfaces (32, 33).

10. A tool as in claim 9, characterized in that the anvil contact surfaces (32, 33) are angled about 75 degrees relative to each other.

11. A tool as in claim 10, characterized in that the ram angled side portions (52, 53) are angled about 75 degrees relative to each other.

12. A tool as in claim 10, characterized in that the pyramid shape (38) has sides angled about 109 degrees relative to opposite sides.

13. A tool as in claim 9, characterized in that the pyramid shape (38) has a flat top (42).

14. A tool as in claim 9, characterized in that the anvil (18) has a flat contact surface (34) between the two angled contact surfaces (32, 33).

15. A tool as in claim 9, characterized in that the pyramid shape (38) has a base and four sides, the two angled side portions (52, 53) extending from the base at two opposite sides and, the front (36) has two nonangled sections extending from the base at the other two opposite sides.

16. A method of crimping an electrical connector to a conductor comprising:
providing a compression tool having a compression head with an anvil surface, a ram with an indenting surface, and means for stopping forward movement of the ram at a predetermined distance from the anvil, the means for stopping forward movement comprising a forward portion of the ram being adapted to contact the anvil surface and stop forward movement of the ram;
advancing the ram from a first position into contact with an exterior of the connector, the connector being sandwiched between the ram and anvil;
deforming the connector by advancing the ram past its contact position with the connector; and
stopping the forward advancement of the ram, characterized in that indenting is made with a surface extending from

a not completely occupied flat section and having a general pyramid shape located in front of the forward portion of the ram, the predetermined distance being taken between the top of the pyramid and the anvil, and the forward advancement of the ram being further stopped upon the occurrence of a predetermined force between the ram and anvil, the predetermined force occurring directly between the ram and anvil at the means for stopping movement when crimping a connector and conductor of a first size and, the predetermined force occurring between the ram and anvil through the connector when crimping a connector and conductor of a second relatively larger size.

Patentansprüche

1. Crimpwerkzeug für einen elektrischen Verbinder mit einem Rahmen (14);
einem zum Rahmen (14) bewegbar montierten Stempel (16), der eine Vorderseite (36) mit einem ersten Abschnitt (40) aufweist, wobei der Abschnitt (40) zwei gewinkelte Seiten (52, 53) enthält, die dazwischen einen flachen Abschnitt (50, 51) aufweisen,
einem Amboß (18), der mit dem Rahmen (14) verbunden ist, wobei der Amboß (18) zwei gewinkelte Seiten (32, 33) aufweist, welche mit dem ersten Abschnitt (40) des Stempels (16) passend in Kontakt gebracht werden können, und zwar mit den gewinkelten Seiten (52, 53) des Stempels, wenn der Stempel (16) in Kontakt mit dem Amboß (18) bewegt wird; und
Mitteln zum Bewegen des Stempels (16) relativ zu dem Amboß (18) zum Crimpen eines dazwischen angeordneten elektrischen Verbinders, dadurch gekennzeichnet, daß
die Vorderseite (36) einen zweiten Abschnitt (38) mit einer eingerückten Erstreckung aufweist, der zweite Abschnitt (38) eine Vorderkante des Stempels (16) bildet und der erste Abschnitt (40) in Längsrichtung hinter dem zweiten Abschnitt (38) angeordnet ist, wobei die eingerückte Erstreckung sich von dem flachen Abschnitt (50, 51) des ersten Abschnitts (40) derart erstreckt, daß der flache Abschnitt (50, 51) nicht vollständig durch den zweiten Abschnitt (38) eingenommen wird.
2. Werkzeug nach Anspruch 1, dadurch gekennzeichnet, daß der Stempel (16) erste (40) und zweite Abschnitte (38) aufweist, welche eine geeignete Größe und Form derart aufweisen, daß ein Kontakt der gewinkelten Seiten (52, 53) des ersten Abschnitts mit den gewinkelten Seiten (32, 33) des Ambosses (18) die Vorwärtsbewe-

gung des Stempels (16) stoppt, wobei der zweite Abschnitt (38) mit einem vorbestimmten Abstand von dem Amboß (18) beabstandet ist.

3. Werkzeug nach Anspruch 2, dadurch gekennzeichnet, daß der vorbestimmte Abstand etwa 6,6 mm (0,26 inch) beträgt. 5
4. Werkzeug nach Anspruch 1, dadurch gekennzeichnet, daß die eingerückte Erstreckung ein flaches Kopfende (42) aufweist. 10
5. Werkzeug nach Anspruch 1, dadurch gekennzeichnet, daß die eingerückte Erstreckung im wesentlichen eine Pyramidenform mit vier Seiten aufweist. 15
6. Werkzeug nach Anspruch 5, dadurch gekennzeichnet, daß die Vorderseite (36) des Stempels (16) zwei flache Seitenabschnitte aufweist, welche sich weg von einer Basis der Pyramidenform erstrecken. 20
7. Werkzeug nach Anspruch 6, dadurch gekennzeichnet, daß die beiden gewinkelten Seiten (52, 53) sich von der Basis der Pyramidenform erstrecken. 25
8. Werkzeug nach Anspruch 1, dadurch gekennzeichnet, daß der Amboß (18) einen flachen Kopfendenabschnitt (34) zwischen den beiden gewinkelten Seiten (32, 33) aufweist. 30
9. Werkzeug nach Anspruch 1, dadurch gekennzeichnet, daß die eingerückte Erstreckung eine Pyramidenform aufweist, welche vor den beiden gewinkelten Seitenabschnitten angeordnet ist, wobei die Pyramidenform (38) eine derartige geeignete Größe aufweist, daß sie nicht mit dem Amboß (18) in Kontakt kommt, wenn die Seitenabschnitte (52, 53) des Stempels die Amboßkontaktflächen (32, 33) kontaktieren. 35 40
10. Werkzeug nach Anspruch 9, dadurch gekennzeichnet, daß die Amboßkontaktflächen (32, 33) relativ zueinander etwa 75° aufweisen. 45
11. Werkzeug nach Anspruch 10, dadurch gekennzeichnet, daß die gewinkelten Seitenabschnitte (52, 53) des Stempels mit einem Winkel von 75° relativ zueinander angeordnet sind. 50
12. Werkzeug nach Anspruch 10, dadurch gekennzeichnet, daß die Pyramidenform (38) Seiten aufweist, die relativ zu gegenüberliegenden Seiten einen Winkel von etwa 109° aufweisen. 55
13. Werkzeug nach Anspruch 9, dadurch gekennzeichnet,

zeichnet, daß die Pyramidenform (38) ein flaches Kopfende (42) aufweist.

14. Werkzeug nach Anspruch 9, dadurch gekennzeichnet, daß der Amboß (18) eine flache Kontaktfläche (34) zwischen den beiden gewinkelten Kontaktflächen (32, 33) aufweist.
15. Werkzeug nach Anspruch 9, dadurch gekennzeichnet, daß die Pyramidenform (38) eine Basis und vier Seiten aufweist, sich die beiden gewinkelten Seitenabschnitte (52, 53) von der Basis an zwei gegenüberliegenden Seiten erstrecken und die Vorderseite (36) zwei nicht gewinkelte Abschnitte aufweist, welche sich von der Basis an den anderen beiden gegenüberliegenden Seiten erstrecken.
16. Verfahren zum Crimpen eines elektrischen Verbinders zu einem Leiter, bei welchem ein Kompressionswerkzeug vorgesehen wird, das einen Kompressionskopf mit einer Amboßoberfläche aufweist, weiterhin einen Stempel mit einer eingerückten Oberfläche und Mittel zum Stoppen der Vorwärtsbewegung des Stempels bei einem vorbestimmten Abstand von dem Amboß, wobei die Mittel zum Stoppen der Vorwärtsbewegung einen vorderseitigen Abschnitt des Stempels enthalten, der mit der Amboßoberfläche in Kontakt kommen kann und die Vorwärtsbewegung des Stempels stoppt; der Stempel vorwärts bewegt wird, ausgehend von einer ersten Position in Kontakt mit einem Äußeren des Verbinders, wobei der Verbinder zwischen dem Stempel und dem Amboß aufgenommen ist; der Verbinder durch ein Vorwärtsbewegen des Stempels hinter seine Kontaktposition mit dem Verbinder deformiert wird; und die Vorwärtsbewegung des Stempels gestoppt wird, dadurch gekennzeichnet, daß das Eindrücken mit einer Oberfläche durchgeführt wird, die sich von einem nicht vollständig eingenommenen flachen Abschnitt erstreckt und eine im wesentlichen Pyramidenform aufweist, angeordnet an der Vorderseite des vorderen Abschnitts des Stempels, der vorbestimmte Abstand ist zwischen der Spitze der Pyramide und dem Amboß abgenommen und die Vorwärtsbewegung des Stempels wird ferner dann gestoppt, wenn eine vorbestimmte Kraft zwischen dem Stempel und dem Amboß auftritt, die vorbestimmte Kraft direkt zwischen dem Stempel und dem Amboß bei den Mitteln zum Stoppen der Bewegung auftritt, wenn ein Crimpen eines Verbinders und eines Leiters einer ersten Größe durchgeführt wird und die vorbestimmte Kraft zwischen dem Stempel und dem Amboß durch den

Verbinder auftritt, wenn ein Verbinder und Leiter einer zweiten relativ größeren Größe gecrimpt werden.

Revendications

1. Outil de sertissage de connecteur électrique, comprenant:

un bâti (14);

un poussoir (16) monté de façon mobile sur le bâti (14), le poussoir (16) possédant une partie antérieure (36) dotée d'une première partie (40) qui possède deux surfaces inclinées (52, 53) enfermant entre elles une section plate (50, 51);

un contre-poussoir (18) relié au bâti (14), le contre-poussoir (18) ayant deux côtés inclinés (32, 33) qui sont destinés à recevoir le contact, de façon concordante, des côtés inclinés (52, 53) de la première partie (40) du poussoir lorsque le poussoir (16) se déplace vers l'avant jusqu'à venir en contact avec le contre-poussoir (18); et

un moyen servant à déplacer le poussoir (16) par rapport au contre-poussoir (18) de façon à sertir un connecteur électrique entre eux,

caractérisé en ce que :

la partie antérieure (36) possède une deuxième partie (38) comportant un prolongement d'enfoncement, la deuxième partie (38) formant un bord antérieur du poussoir (16) et la première partie (40) étant disposée longitudinalement en arrière de la deuxième partie (38), le prolongement d'enfoncement faisant saillie de la section plate (50, 51) de la première partie (40), de sorte que la section plate (50, 51) n'est pas complètement occupée par la deuxième partie (38).

2. Outil selon la revendication 1, caractérisé en ce que la première partie (40) et la deuxième partie (38) du poussoir (16) sont dimensionnées et conformées de manière appropriée de façon que le contact des côtés inclinés (52, 53) de la première partie avec les côtés inclinés (32, 33) du contre-poussoir arrête le déplacement vers l'avant du poussoir (16) alors que la deuxième partie (38) est encore écartée d'une distance prédéterminée vis-à-vis du contre-poussoir (18).

3. Outil selon la revendication 2, caractérisé en ce que la distance prédéterminée est d'environ 6,6 mm (0,26 pouce).

4. Outil selon la revendication 1, caractérisé en ce que le prolongement d'enfoncement possède une partie supérieure plate (42).

5. Outil selon la revendication 1, caractérisé en ce

que le prolongement d'enfoncement est une forme sensiblement pyramidale à quatre côtés.

6. Outil selon la revendication 5, caractérisé en ce que la partie antérieure (36) du poussoir possède deux sections latérales plates qui se prolongent de la base de la forme pyramidale.

7. Outil selon la revendication 6, caractérisé en ce que les deux côtés inclinés (52, 53) du poussoir se prolongent de la base de la forme pyramidale.

8. Outil selon la revendication 1, caractérisé en ce que le contre-poussoir (18) possède une section supérieure plate (34) entre ses deux côtés inclinés (32, 33).

9. Outil selon la revendication 1, caractérisé en ce que le prolongement d'enfoncement possède une forme pyramidale se trouvant en avant des deux parties latérales inclinées, la forme pyramidale (38) étant dimensionnée de manière appropriée de façon à ne pas se trouver en contact avec le contre-poussoir (18) lorsque les parties latérales (52, 53) du poussoir sont en contact avec les surfaces de contact (32, 33) du contre-poussoir.

10. Outil selon la revendication 9, caractérisé en ce que les surfaces de contact (32, 33) du contre-poussoir sont inclinées d'un angle d'environ 75° l'une par rapport à l'autre.

11. Outil selon la revendication 10, caractérisé en ce que les parties latérales inclinées (52, 53) du poussoir font un angle d'environ 75° l'une par rapport à l'autre.

12. Outil selon la revendication 10, caractérisé en ce que la forme pyramidale (38) possède des côtés qui font un angle d'environ 109° par rapport aux côtés opposés.

13. Outil selon la revendication 9, caractérisé en ce que la forme pyramidale (38) possède un sommet plat (42).

14. Outil selon la revendication 9, caractérisé en ce que le contre-poussoir (18) possède une surface de contact plate (34) entre ses deux surfaces de contact inclinées (32, 33).

15. Outil selon la revendication 9, caractérisé en ce que la forme pyramidale (38) possède une base et quatre côtés, les deux parties latérales inclinées (52, 53) se prolongeant depuis la base au niveau de deux côtés opposés, et la partie antérieure (36) possède deux sections non inclinées

se prolongeant depuis la base au niveau des deux autres côtés opposés.

16. Procédé de sertissage d'un connecteur électrique sur un conducteur, comprenant les opérations suivantes: 5
- produire un outil de compression qui possède une tête de compression dotée d'une surface de contre-poussoir, un poussoir doté d'une surface d'enfoncement et un moyen servant à 10
- arrêter le mouvement du poussoir vers l'avant à une distance prédéterminée du contre-poussoir, le moyen qui sert à arrêter le mouvement vers l'avant comprenant une partie antérieure du poussoir qui est destinée à venir en contact avec 15
- la surface du contre-poussoir et à arrêter le mouvement du poussoir vers l'avant ;
- faire avancer le poussoir, à partir d'une première position, jusqu'en contact avec une surface extérieure du connecteur, le connecteur 20
- étant pris en sandwich entre le poussoir et le contre-poussoir ;
- déformer le connecteur en faisant avancer le poussoir au-delà de sa position de contact avec le connecteur ; et 25
- arrêter le mouvement du poussoir vers l'avant,
- caractérisé en ce que :
- l'enfoncement est effectué à l'aide d'une surface se prolongeant d'une section plate non 30
- complètement occupée et ayant une forme sensiblement pyramidale qui se trouve en avant de la partie antérieure du poussoir, la distance prédéterminée étant prise entre le sommet de la pyramide et le contre-poussoir et le déplacement du 35
- poussoir vers l'avant étant encore arrêté à l'apparition d'une force prédéterminée entre le poussoir et le contre-poussoir, la force prédéterminée apparaissant directement entre le poussoir et le 40
- contre-poussoir au niveau du moyen servant à arrêter le mouvement lors du sertissage d'un connecteur et d'un conducteur d'une première 45
- taille et la force prédéterminée apparaissant entre le poussoir et le contre-poussoir par l'intermédiaire du connecteur lors du sertissage d'un connecteur et d'un conducteur ayant une deuxième 50
- taille, relativement plus importante.

50

55

FIG. 1.

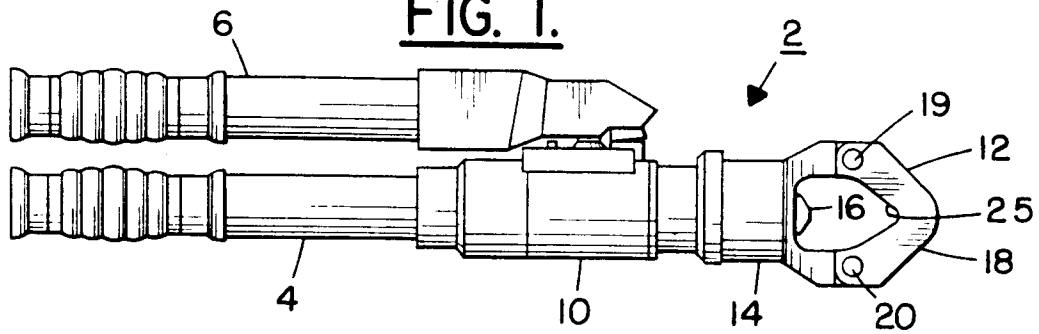


FIG. 2.

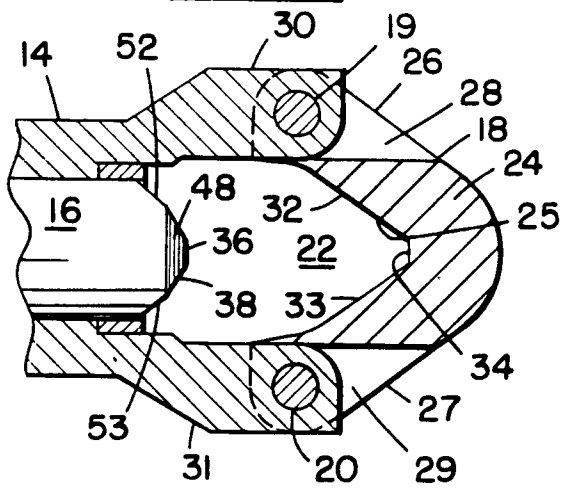


FIG. 3.

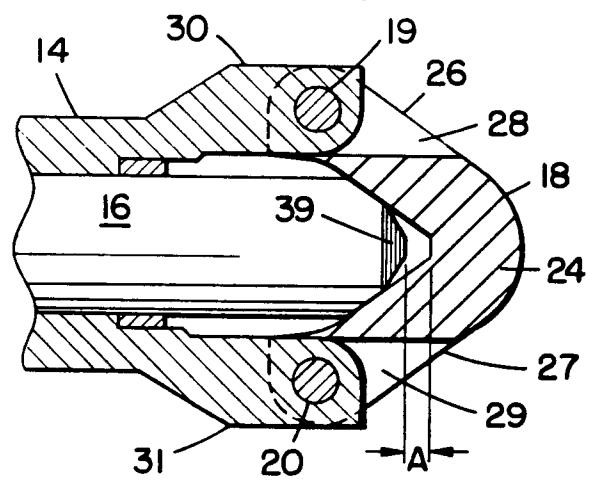


FIG. 4.

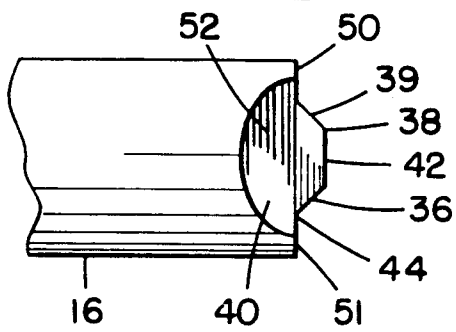


FIG. 5.

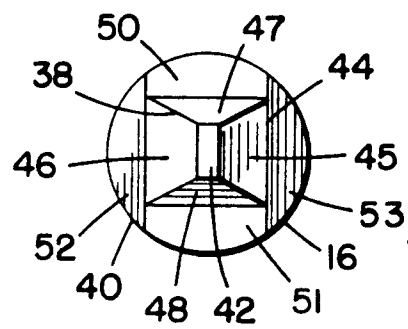


FIG. 6.

